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MORMON FIRE REHABILITATION PROJECT

Environmental Assessment Record
NV-050-8-78

Prepared by: James P. Dunn
Outdoor Recreation Planner

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I. Description of the Proposed Action and Alternative

A. Proposed Action

The proposed action consists of reseeding the 2,620-acre Mormon Fire Site which burned on July 7, 8, and 9, 1978. The fire occurred in Townships 10 and 11 South, Range 67 East. (See map).

The following is the recommended seed species and seeding technique proposed for the site:

Seed approximately 800 acres in bottoms with rangeland drill. Seed remaining steeper slopes by broadcasting with a helicopter.

Species	Rate (lbs./acre) Drill	Broadcast
Crested wheatgrass	2	3
Pubescent wheatgrass	1	2
Sand dropseed	½	1
Alfalfa (Ladak)	1	2
Small burnet	1½	3
Globemallow	½	1
Fourwing saltbush	2½	5
Winterfat	1½	3
Utah service berry	½	1
	11	21

Due to the relatively dry climate most of the year, the seeding should take place some time in the late fall or early winter to best utilize the peak rainfall period of the year. The project should be completed by December 15th.

B. Alternative to the Proposed Action

1. Re-seed the entire area by broadcasting only.

2. Use a combination of hand crews and broadcast seeding practices to accomplish the desired work.

3. Not re-seed the fire area and let it revegatate itself. through natural successession.

II Description of the Existing Environment

A. Non-Living Components

1. Air

Air quality is generally good within the area since the

subject lands are far from large population centers. Air quality may deteriorate at times due to the Reed-Gardner Power Plant located 25 miles south-southwest of the fire location.

2. Land

a. Status

The fire scar lies wholly on and within public domain administered by the Bureau of Land Management.

b. Present Uses

The area in general has an undetermined amount of small and big game hunting use along with some random rockhounding, hiking, and camping.

c. Range

The burned area is located near the center of the Mormon Peak Allotment. Livestock owned by the Foremaster Brothers are authorized to graze on this allotment.

d. Soils

The soils within the area are identified by site. Four specific sites were examined in the burn area. They were selected as typical and the most representative of the major soils in the watershed.

1) in the major wash

2) in a side tributary

3) on a centrally located eroded ridge of a low mountain

4) on a ridge near the westernmost edge of the burned area

In the wash the soils are deep (4-6 feet) and very gravelly sandy loams. This alluvium is somewhat excessively drained and has a low water holding capacity (.048 in/in). This soil is moderately alkaline (pH 7.9 to 8.4). Gravel content is 60%. Present water erosion hazard is moderate. During a high intensity convective

localized storm severe erosion may occur, because of large quantity and increased velocity of water flowing into the wash area from the adjoining mountain slopes. Gradient of the wash is 2 to 4%.

In the short side tributaries the soil is deep (over 4 feet) in the centers of the washes and becomes less deep near the sides. These are very gravelly sandy loams. They are well drained to excessively drained and have very low water holding capacities for plant growth. These soils are moderately alkaline with a pH of 8.4 at the surface and 7.9 in the subsurface horizons. There are lime deposits on pebbles. The soil surface is 70 to 90% gravel. In the subsurface horizon at about 6" depth there is evidence of organic matter accumulation and many roots. Gradients of these soils are 2 to 8% and erosion is a potential hazard.

On a centrally located ridge of a low mountain the soils are loamy-skeletal, carbonatic, thermic Lithic Torriorthents, probably the St. Thomas series. These soils are very shallow, ranging from 6" to 10" deep. The texture throughout is loam modified by limestone rock fragments. The pH is 8.0 to 8.4 and there are secondary carbonate deposits on pebbles and rocks. No lime concretions were observed. Sixty-five to 90% of the soil surface is covered by pebbles and cobbles. In the surface horizon there are less than 35% rock fragments but the underlying material has 90% or more fragments. Roots are scarce and only few fine and very fine roots were seen. Slopes range from 30 to 65%. Water holding capacity is very low (.075 in/in) and due to the shallowness of the soil water available for plant growth is limited. The present erosion hazard is moderate. During high intensity convective storms the erosion hazard is severe because of the combined effects of gradient and the absence of vegetation to interrupt rainfall impact.

The soils examined on the westernmost reaches of the fire are very similar to the St. Thomas soils just discussed. Texture, depth, pH, rock fragment in the subsurface horizon and roots are as described above. Color of the soil is slightly more red. This may be caused by this soil being

at a higher elevation where there is more moisture during periods of the year and a slight increase in iron coatings on the sand particles. Evidence of soil creep can be seen by accumulation of soil at plant crowns and upslope of deeply imbedded rock fragments. There is little gully erosion now going on, but sheet erosion most probably does occur. The pH of this soil is 7.9 to 8.4 (moderately alkaline) and it is violently effervescent. Soil structure of the surface layer is platy (firm cohesive platelike soil peds) and runoff would be high. Water holding capacity is limited by the shallow depth and rock fragment content, and is low. Slopes range 30 to 50% except near the rock outcrop where it may exceed 100%.

e. Land Use Capability

The proposed action should not conflict with any other land uses. These uses are:

1) Potential wilderness

2) Bighorn Sheep habitat

3) Livestock grazing

f. Land Suitability

The terrain within the proposed action site consists of steep slopes and ridges with small flats and a central drainage level enough for rangeland drilling. The vegetation that was present before the fire is totally gone. With the possibility of heavy rains in the area, any action directed toward soil stabilization would enhance all land use activities.

3. Water

There are no active streams, lakes, reservoirs, or developed waters in the vicinity of the fire site. Annual precipitation is about 6" at the lowest elevation, increasing to about 14" at the highest elevation.

B. Living Components

1. Vegetation

Three vegetation types occurred within the boundaries of the fire. The types as described by the Caliente Range

Survey (1976) are: 1) Blackbrush/Big Sage, 2) Blackbrush/Ephedra and 3) Blackbrush/Yucca.

Approximately 1,400 acres of the burn was in the Blackbrush/Yucca type. This type occurred at the lower elevations and ranged from approximately 3,300 to 4,500 feet. A summary of the vegetation in this type is as follows:

Density - 23%
Composition:
Grass - 10%
Forb - 1%
Shrub - 89%

The dominant species in this type was blackbrush with 39% composition. Annual grasses made up 7% with perennial grasses making up 3% of the total vegetation. Reference Caliente Range Survey write-up 1044-08.

Nearby, 850 acres of the Blackbrush/Ephedra type were consumed by the fire. The elevation in the burn area of this vegetation type range from approximately 3,700 to 4,700 feet. The vegetation of this type is summarized as follows:

Density - 7%
Composition:
Grass - 30%
Forb - 22%
Shrub - 48%

The dominant shrub was blackbrush which made up 10% of the total vegetation. Ephedra made up 7% of vegetal composition. Some other shrubs occurring in this type were big sage, cliffrose, live oak and desert peach. Annual grasses made up the 30% of the vegetal composition. Forbs were abundant with globemallow, desert marigold, and filaree being the major species. Reference Caliente Range Survey write-up 1044-05.

Approximately 350 acres in the Blackbrush/Big Sage type were burnt. The elevation ranged from approximately 4,600 to 5,200 feet. A summarization of this type is as follows:

Density - 23%
Composition
Grasses - 28%
Forbs - 6%
Shrubs - 66%

The dominant shrub in this type is blackbrush, making up 13% of the vegetal composition. Big sage makes up 11% of the vegetation and serviceberry 7%. Some other shrubs

occurring in the type are ephedra, shrubby erioganom and cliffrose. Pinyon pine and juniper are scattered through the type with a total of 6% cover. The dominant grass is desert needle grass, which makes up 12% of the vegetation. Eleven percent of the vegetation is annual grasses. Other grasses occurring in this type are squirreltail, Nevada bluegrass, three awn and Indian ricegrass. The major forb species are globemallow and buckwheat.

No rare and endangered plants are known to exist in the area.

2. Wildlife

A brief helicopter survey in the vicinity of the burn was done on July 17, 1978. Twenty-one bighorn sheep were counted. Within the boundaries of the fire bighorn sheep tracks and pellet groups were found. Reports from NDF&G indicated that the area is used heavily by bighorn sheep. The drainages burnt are in close proximity to steep and rocky ridges that are necessary to bighorn sheep for cover. The area probably provided a good foraging area for bighorns.

The Mormon Range is known to support a deer herd and use in the burn area probably does occur. Several deer were seen in the general area.

Three raptor nest sites were spotted during the helicopter survey. It was not determined if the nests were presently occupied or not. Because of the lack of dense over-story and the closeness of the area to rugged cliff areas (nesting areas) it probably has provided a good hunting area for raptors.

Primary inhabitants of the area are rabbits, Gamble quail, lizards, snakes, ground squirrels, and rats. A variety of small birds, and other small mammals are also present, such as kit foxes, coyotes, and bobcats.

Rare species (Nevada State classification) which may exist in the area include the Desert Tortoise and the Gila Monster. No known (Federally) threatened or endangered species inhabit the area.

3. Ecological Interrelationships

The interrelationships are standard for this part of the desert biome. Shrub and grass species make up the majority of the producers. They depend on soil, moisture, nutrients, and solar energy for growth and reproduction. Various wildlife species feed upon this vegetation and each other to acquire energy. Decomposers break down plant and animal

materials and re-cycle them back into the soil where they are again available to the producers.

4. Human Values

a. Landscape Character

The area is a series of uplifts and folds originating from a parent material of Paleozoic limestone.

b. Human Populations

The fire site is located nowhere near any human population center. The nearest habitation is northwest of the fire about 9 miles. The railroad switching station of Carp, Nevada, has a lineman living there throughout the year.

c. Cultural and Social Values

No cultural values were observed during the fire suppression activities and several subsequent trips to the fire site. However, the Mormon Mountains area has been identified through the Bureau's planning efforts as being an area rich in cultural expressions. Known cultural site types include: agave roasting pits, shelter caves, open sites near springs, and numerous rock art sites. Pending completion of the Management Framework Plan for the Caliente Planning Unit, a Cultural Resource Management Plan (CRMP) will be completed for a portion of the Mormon Mountains.

d. Wilderness Values

Roadless inventories for the district have not been completed. The fire site is located within an area greater than 5,000 acres. It appears that the land surrounding the site meets the basic requirements of the Wilderness Act and does have wilderness characteristics. The area has strong potential and will fall into the study category when the Wilderness Regulations come out.

III. Analysis of the Proposed Action and Alternatives

A. Proposed Action

1. Environmental Impacts

a. Anticipated Impacts

1) Noise

Helicopter and tractor engine noise will disturb the large and small mammals, birds, and reptiles for a temporary period while the action is in progress.

2) Soil Disturbance

The soil in the bottom areas where the rangeland drilling is suggested to take place will be broken up and loosened by the drill and the pads of the tractor. Very little compaction is expected due to lack of moisture in the soil. Some destruction of the existing desert pavement will also occur, opening the area to increased erosion potential from wind and rain.

3) Wildlife

The proposed action, if allowed, will have both positive and negative impacts on the wildlife found in and around the burn area.

The negative impact would be short-lived while the project is taking place. The noise from the tractor and helicopter will disturb the wildlife during this period.

The positive impacts are:

a) The re-establishment of and increased quantity of palatable grasses, shrubs, and forbs.

b) The diversity of forage species supplied by the seeding will improve habitat conditions for a large variety of wildlife species.

c) A longer green and succulent period.

d) Higher yield and nutritive value.

e) The seeding will provide a varied diet.

f) Additional livestock forage.

4) Cultural and Social Values

Impacts to any unknown cultural resources may occur if the proposed action were to be adopted.

Areas of primary concern would be:

a) Those areas where the rangeland drilling were to take place.

b) The area where the temporary camp is placed.

5) Human Values

The proposed action, if allowed, will provide a more aesthetically pleasing experience to visitors of the area, thereby enhancing the quality of their lives. Conversely, other people may view the project as an intrusion of a natural phenomenon found within an environment.

6) Land Uses

The proposed action has a beneficial impact on land uses to wildlife and range use management due to the increased forage and vegetation that should occur from the re-seeding project. It does not conflict with any MFP decision in the Caliente Resource Area.

7) Wilderness Potential

The proposed action has a two-fold impact on the wilderness potential of the area. These impacts are:

a) Re-seeding may distract from the naturalness of the area.

b) Ingress, egress, and rangeland drilling may create lasting scars which might distract from any wilderness characteristics found to exist on the site.

b. Possible Mitigating Measures

1) A BLM official should be present to monitor the operation and insure that all contract stipulations be complied with.

2) The contractor should do everything possible to insure the stipulations are carried out.

3) If archaeological resources are found on the site or while ingress to the site, the Las Vegas District Manager or Caliente Resource Area Manager should be notified immediately.

4) Painting of rocks for alignment or any other reason will not be allowed unless it is of a temporary type.

5) Ingress and egress of the site should be limited to a single trip to lessen the impacts on the environment.

6) A temporary camp site should be allowed on the site while the work is being done to limit the contractor's stay and still provide for the one trip in and out.

7) A general clean-up of the area will be required after the work has been completed to insure that no litter is left in the area.

8) No bulldozing should be done without prior approval of the District Manager. Access to and from the site will be by use of the existing road. No off-road travel will be authorized in traveling to and from the project site.

c. Recommendations for Mitigation or Enhancement

It is recommended that all of the above possible mitigating measures be part of the re-seeding contract as special stipulations.

d. Residual Impacts

Some soil disturbance will occur within the confines of the burnt area, possibly causing some loss of the area's naturalness. This would only develop over the area that is drilled. Since the drill is an important part of the project, the smallest tractor capable of pulling the drill will aid in lowering the amount of disturbance on the site.

2. Relationship Between Short-Term Use and Long-Term Productivity

The proposed action has both short-term use and long-term aspects which make evaluation of action difficult to assess.

The short-term use of the area would be the proposed action, or the seeding of the burnt area. The re-seeding process should only last for about two or three days, but the effects of the project may be apparent for years. Some of the short-term effects are:

a. An increase in man's activities in the area while the project is going on.

b. Travel up and down a wash that has had very little use in the past.

c. Tractors and rangeland drills present in an almost natural environment.

d. Possible blowing dust and loss of soil.

e. Loss of naturalness.

f. A road in and out of the area.

Long-term effects are:

a. Loss of naturalness.

b. A road in and out of the area.

c. Increased forage for the wildlife and range uses.

d. Accelerate the period of time that natural succession takes to stabilize soil and ground cover.

e. A more aesthetically pleasing area to the eye.

The long-term use of the area must be looked at from two different sides. They are:

a. The wildlife as well as the overall soil stability of the area will benefit by the long-term use and have similar effects previously mentioned as impacts. This use can be considered to be a long-term use that may affect long-term productivity through a slow, steady increase in carrying capacity of the environment.

b. The long-term aspects of the area in terms of its natural character are unknown, but could adversely affect the long-term productivity of the area in terms of wilderness potential and its immediate environment.

3. Irreversible and Irretrievable Commitment of Resources

The approval of the proposed action as defined above in no way constitutes any known irreversible or irretrievable commitment of resources other than the fuel consumed for the project.

B. Alternative #1

1. Environmental Impacts of the Alternative

a. Anticipated Impacts

1) Noise

The noise impact would be largely the same as mentioned in the proposed action section. Work would be done in a much shorter period of time.

2) Soil Disturbance

Soil disturbance would be held to a minimum. The only disturbance would be related to the rotor downwash from the helicopter as the seeding took place. This action would eliminate the driving into the the area by vehicles and the rangeland drilling.

3) Wildlife

This alternative action could show some lesser level of success to the re-seeding project which in turn would reflect on the amount of forage available to the wildlife and range animals in the area.

4) Cultural and Social Values

There are no known impacts to the cultural resouces derived from this alternative action.

5) Human Values

The adoption of this alternative would be similar to the Human Values portion of the proposed action.

6) Land Use

There are no known changes in land uses that differ from those mentioned in the Proposed Action section.

7) Wilderness Potential

The impacts on the wilderness potential would be similar to that of the Proposed Action with the exception that without the rangeland drilling,

ingress and egress would not occur on the site. This would eliminate any further damage to the bottoms of the site and the access into the area. The possibility of the area remaining in a more natural state would be accomplished.

b. Possible Mitigating Measures

A base for the helicopter to do its seed loading and refueling could be located further north of the fire area to insure that the old roadway into the fire wouldn't receive any additional damage. (Possible location somewhere around Carp, Nevada).

Additional mitigating measures have been previously identified in the Proposed Action. Measures which relate to ingress and egress to the site would not be recommended for this alternative as well as the camp measure.

c. Recommendations for Mitigation or Enhancement

A base for the helicopter should be established outside and to the north of the fire area. Any additional measures should be incorporated from the Proposed Action with those exceptions mentioned above.

d. Residual Impacts

There are no residual impacts other than some possible loss of the area's natural character.

2. Relationship Between Short-Term Use and Long-Term Productivity

The short-term use would be the action on the site with very little impact to the environment.

The long-term productivity to the area would be similar to the positive long-term effects of the Proposed Action.

3. Irreversible and Irretrievable Commitment of Resources

This alternative would have no change from the Proposed Action statement.

C. Alternative #2

1. Environmental Impacts of the Alternative

a. Anticipated Impacts

1) Noise

This impact would be the same as mentioned in the Proposed Action section.

2) Soil Disturbance

Soil disturbance would again be held to a minimum due to no rangeland drill and ingress and egress. Rotor downwash would cause a small amount and the appearance of a hand planting crew would also cause some. The crew could walk in and the soil disturbance would again be held to a minimum with dibbles and rakes.

3) Wildlife

With the combination of broadcast seeding and hand planting the desired effects of the seeding should be achieved similar to the Proposed Action. There is a good possibility that additional acreage can be hand planted over the proposed rangeland drilling.

4) Cultural and Social Values

The impacts will be similar to the impacts discussed in the Proposed Action section.

5) Human Values

This section is again similar to those discussed in the Proposed Action section.

6) Land Use

No change from the Proposed Action section.

7) Wilderness Potential

This alternative would aid in limiting the amount of wilderness character that may be lost in approving the Proposed Action. Due to the fact that the hand crew could walk in to the area you would not lose any character from ingress or egress and rangeland drilling.

b. Possible Mitigating Measures

1) A temporary base camp should be allowed on or near the fire site to lessen the time to get to the site and shorten their stay in the area.

2) A general clean-up of the area will be required after the work has been completed to insure that no litter is left in the area.

3) If archaeological resources are found on the site or the surrounding area, the Las Vegas District Manager or the Caliente Resource Area Manager will be notified immediately.

4) A BLM official should be present to monitor the operation and ensure that all contract stipulations be complied with.

c. Recommendation for Mitigation or Enhancement

It is recommended that all of the above Possible Mitigating Measures be made part of the re-seeding contract as special stipulations.

d. Residual Impacts

There are no known residual impacts to the environment that would result from this action.

2. Relationship Between Short-Term Use and Long-Term Productivity

Short-term use would have to relate to the action taken on the site. There should be little to no resource damage and the use will be short-lived only while the contract is being completed.

Long-term productivity to the area would be similar to the positive long-term effects of the Proposed Action.

3. Irreversible and Irretrievable Commitment of Resources

The approval of this alternative action in no way constitutes any known irreversible or irretrievable commitment of resources other than the fuel consumed during the project.

D. Alternative #3

1. Environmental Impacts of the Alternative

a. Anticipated Impacts

If this alternative is selected, any negative impacts

previously discussed would probably be avoided with the exception of soil loss due to rain and wind. The fire area would be left to re-seed naturally which may take years to accomplish.

The moisture level for this area may cause this alternative to be looked at due to the cost of seed. A 6-14" level is marginal at best.

IV. Persons, Groups, and Government Agencies Contacted

Bob McQuivey, Wildlife Biologist, Nevada Fish & Game Dept.
Harry Borup, Soil Scientist, Soil Conservation Service
Loren Brazell , BLM, Nevada State Office Watershed Specialist

V. Intensity of Public Interest

Although there is undoubtedly interest in the fire area, no written comments have been received.

VI. Participating Staff

Frank Bingham, Chief of Resource Management
Don Buck, Soil Scientist
Gordon Cheniae, District Realty Specialist
Tom Combs, District Wild Horse & Burro Specialist
Terry Driver, District Range Conservationist
Bruce Flinn, Planning & Environmental Coordinator
Dave Pulliam, District Wildlife Biologist
Phil Range, Caliente Resource Area Manager
Stan Rolf, District Archaeologist
Hans Sallani, Realty Specialist
Terry Sodorff, Range Conservationist
Pete Sozzi, Cultural Resources Technician
Dave Wolf, Recreation Planner
Howart Wirtz, District Geologist

VII. Summary

One important aspect that has not been addressed is the fact that this fire was not started by natural causes. On the morning of July 7th, a military airplane, an F-4 fighter, crashed into the Mormon Mountains starting the 2,600-acre fire.

This underlying factor should be considered when making a decision on this EAR. Because it was man-caused, man should possibly have a hand in putting it back to a more natural state.

It is recommended that Alternative #2 be looked at closely. In my opinion, broadcasting the upper slopes and hand planting the bottoms would be a wiser, more successful way to go about re-seeding the area. There would be little impact on the natural resources and you wouldn't get the drill lines on the land. Also, the hand crews could plant higher on the hills than the drill. The Wildlife Biologist could aid in directing the planting crew to plant the desired species in selected areas, getting a more natural looking landscape out of the end product.

VIII. Signatures

9/27/78 — James P. Dunn
Date — James P. Dunn, Outdoor Recreation Planner

Recommended for Approval by:

9/29/78 — Bruce E. Flinn
Date — Bruce Flinn, Environmental Coordinator

10/17/78 — Frank E. Bingham
Date — Frank Bingham, Chief, Div. of Resource Mgmt.

10/3/78 — Terry H. Sodorff acting
Date — Phil Range, Area Manager

Approved:

10/18/78 — John S. Boyles
Date — John S. Boyles, District Manager

MORMON MOUNTAIN REHABILITATION
Report on Flora & Fauna

by: Dave Pulliam
Wildlife Biologist

Bureau of Land Management
Las Vegas District
Las Vegas, Nevada

August, 1978

Introduction

On July 7, 8 and 9, 1978, a wildfire burnt approximately 2,600 acres in the northern portion of the Mormon Mountains. The fire occurred in Townships 10 & 11 South, Range 67 East. The purpose of this report is to describe the pre-fire condition with respect to vegetation and wildlife.

Vegetation

Three vegetation types occurred within the boundaries of the fire. The types as described by the Caliente Range Survey (1976) are: 1) Blackbrush/Big Sage, 2) Blackbrush/Ephedra and 3) Blackbrush/Yucca.

Approximately 1,400 acres of the burn was in the Blackbrush/Yucca type. This type occurred at the lower elevations and ranged from approximately 3,300 to 4,500 feet. A summary of the vegetation in this type is as follows:

Density - 23%
Composition:
- Grass - 10%
- Forb - 1%
- Shrub - 89%

The dominant species in this type was blackbrush with 39% composition. Annual grasses made up 7% with perennial grasses making up 3% of the total vegetation. Reference Caliente Range Survey write-up 1044-08.

Nearby, 850 acres of the Blackbrush/Ephedra type were consumed by the fire. The elevation in the burn area of this vegetation type range from approximately 3,700 to 4,700 feet. The vegetation of this type is summarized as follows:

Density - 7%
Composition:
- Grass - 30%
- Forb - 22%
- Shrub - 48%

The dominant shrub was blackbrush which made up 10% of the total vegetation. Ephedra made up 7% of vegetal composition. Some other shrubs occurring in this type were big sage, cliffrose, live oak and desert peach. Annual grasses made up the 30% of the vegetal composition. Forbs were abundant with globemallow, desert marigold, and filarii being the major species. Reference Caliente Range Survey write-up 1044-05.

Approximately 350 acres in the Blackbrush/Big Sage type were burnt. The elevation ranged from approximately 4,600 to 5,200 feet. A summarization of this type is as follows:

Density - 23%
Composition:
Grasses - 28%
Forbs - 6%
Shrubs - 66%

The dominant shrub in this type is blackbrush, making up 13% of the vegetal composition. Big sage makes up 11% of the vegetation and serviceberry 7%. Some other shrubs occurring in the type are ephedra, shrubby erioganom and cliffrose. Pinyon pine and juniper and scattered through the type with a total of 6% cover. The dominant grass is desert needle grass, which makes up 12% of the vegetation. Eleven percent of the vegetation is annual grasses. Other grasses occurring in this type are squirreltail, Nevada bluegrass, three awn and Indian ricegrass. The major forb species are globemallow and buckwheat.

Wildlife

A brief helicopter survey in the vicinity of the burn was done on July 17, 1978. Twenty-one bighorn sheep were counted. Within the boundaries of the fire bighorn sheep tracks and pellet groups were found. Reports from NDF&G indicated that the area is used heavily by bighorn sheep. The drainages burnt are in close proximity to steep and rocky ridges that are necessary to bighorn sheep for cover. The area probably provided good foraging area for bighorns.

Deer were not seen in the area, however, the Mormon Range is known to support deer herds and use in the burn area probably does occur.

Three raptor nest sites were spotted during the helicopter survey. It was not determined if the nests were presently occupied or not. Because of the lack of dense over-story and the closeness of the area to rugged cliff areas (nesting areas) it probably has provided a good hunting area for raptors.

Recommendations

It is recommended that a reseeding be done in this area before December of this year to provide forage for bighorn sheep and deer. This would also provide cover and a food source for small mammals which may be important in the food web. The following steps are proposed:

1. Seed mixture and rate:

Species	Rate (lbs./acre) Drill	Broadcast
Crested wheatgrass	1	2
Pubescent wheatgrass	1	2
Sand dropseed	½	1
Alfalfa (Ladak)	1	2

Species	Rate (lbs./acre) Drill	Broadcast
Small burnet	1½	3
Globemallow	½	1
Fourwing saltbush	2½	5
Winterfat	1½	3
Utah serviceberry	½	1
	10	20

2. Seed approximately 800 acres in bottoms with rangeland drill.

3. Seed remaining steeper slopes by broadcasting with a helicopter.

4. Monitor seeding for livestock use and if protection for establishment is needed fence the seeding.

5. Set up studies to determine success or failure of seeding. Studies should measure:

   1. Seedling establishment
   2. Production
   3. Utilization

   Studies should be set up to compare seeded and non-seeded areas within the burn. Utilization should be looked at on a seasonal basis.

Species	Rate (lbs./acre) Drill	Broadcast
Small burnet	1½	3
Globemallow	½	1
Fourwing saltbush	2½	5
Winterfat	1½	3
Utah serviceberry	½	1
	10	20

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:

TO : Jim Dunn Date: 9-20-78

FROM : Don Buck

SUBJECT : Addedum to soils report on Horse Thief Canyon Fire.

On September 15, 1978, I revisited the area of the August 26-27, 1978 fire. Accompanying me was John Shive, Range Conservationist. The following information was obtained.

I. Description of an Area Adjacent to Burn

About 60-65% ground cover on bottoms: about 45% ground cover on side slopes.

Most grasses are annual bromes shrub are big sage, hackberry, Ephedra, greasewood, snake weed, Yucca, and some blackbrush.

Plant community is shrub with understory of grasses. A reasonable guess is 80% shrub and 20% grasses (rated in production).

II. Revised and Changed Information on Soils

A. MF-1

During the 2 days prior to this site investigation, there had been cloud cover and rain. Following the rain, at Pit MF-1 (see initial Report Map) it was found the moisture in the soil was to a depth of 5" to 6".

The pH was again tested and found to be 8.0, as was expected.

Plant nutrient tests were done, using a Sudbury N, P, K test kit. At site MF-1, phosphorus (P) and potassium (K) were found to be low, nitrogen (N) was found to be adequate. The ratings are not in PPM as the Sudbury Kit is not sufficient for that accuracy.

Temperature at 5" was 18°C at 12 noon, partly cloudy and about 12 hours since last rainfall. This site was not totally burned over.

B. MF-2

Site MF-1 had been totally burned over, and is on reasonably flat land.

Moisture was found at a depth of 4" less than site MF-1.

DSC-1541-2
Mar. 1974

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

To : Jim Dunn

Date: 9-20-78

From : Don Buck

SUBJECT : Addedum to soils report on Horse Thief Canyon Fire.

On September 15, 1978, I revisited the area of the August 26-27, 1978 fire. Accompanying me was John Shive, Range Conservationist. The following information was obtained.

I. Description of an Area Adjacent to Burn.

About 60-65% ground cover on bottoms: about 45% ground cover on side slopes.

Most grasses are annual bromes shrub are big sage, buckberry, Ephedra, greasewood, snake weed, Yucca, and some blackbrush.

Plant community is shrub with understory of grasses. A reasonable guess is 80% shrub and 20% grasses (rated in production).

II. Revised and Changed Information on Soils

A. MP-1

During the 2 days prior to this site investigation, there had been cloud cover and rain. Following the rain, at Pit MP-1 (see Initial Report Map) it was found the moisture in the soil was to a depth of 5" to 6".

The pH was again tested and found to be 8.0, as was expected.

Plant nutrient tests were done, using a Sudbury N, P, K test kit. At site MP-1, phosphorus (P) and potassium (K) were found to be low, nitrogen (N) was found to be adequate. The ratings are not in PPM as the Sudbury Kit is not sufficient for that accuracy.

Temperature at 5" was 18°C at 12 noon, partly cloudy and about 12 hours since last rainfall. This site was not totally burned over.

B. MP-2

Site MP-1 had been totally burned over, and is on reasonably flat land.

Moisture was found at a depth of 4" less than site MP-1.

This may be caused by different plant residue following the fire.

At 5", the temperature was 19.5°C; perhaps due to the darker colored surface.

A notable change has occurred at this site. The surface pH has lowered to 8.0-8.2. This was most likely changed by actions of the rain water. The pH at 2" depth and deeper remains as previously reported (7.8-8.0).

Nutrient tests show N low, P low, and K barely sufficient, yet higher than site MF-1.

Harold T. Seeley II

7441
(N-057)

FEASIBILITY REPORT

MORMON MOUNTAIN REHABILITATION
REPORT ON SOILS

By: Donald F. Buck, Jr.
Soil Scientist

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

Bureau of Land Management
Las Vegas District
Las Vegas, Nevada

July, 1978

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

I. Purpose

A fire recently occurred in the Mormon Mountains as the result of an Air Force F-4 plane crash. The fire consumed the native vegetation on over 2600 acres centered around 37°02N latitude and 114°26' E longitute. The purpose of this report is to present recommendations for the revegetation of the burned watershed from a soils perspective. The Soil Scientists involved in a field study of the area on July 17, 1978, were:

Donald F. Buck, Jr. (BLM)
Harry J. Borup (SCS)
Paul A. Hardy (BLM)

II. Scope

On-site investigations of the soils in this specific watershed have not been done in the past. There is presently a third order reconnaissance survey being done in the area (SCS 754) by the Soil Conservation Service (SCS), but specific information and soils data is lacking. Because this study pertains only to soils potential and capabilities, there is only limited discussion on plant types and species and they remain to be selected by BLM plant specialists. If range seeding is proposed the means by which it should be done is also not discussed, except as it pertains to the soils.

III. Geomorphology

The watershed is located in a Basin and Range mountain area with elevations of 3800' to 5200' above sea level. Gradients range from 2% slopes to those in excess of 65%. Rock outcrop throughout the area is about 25%. There is one major ephemeral wash and numerous short tributaries. Except for the major wash, the area has a typical desert appearance and pebble covered surface. The genetic material from which the soils formed is limestone and dolomite, and the ridges surrounding the watershed are exposed decomposing and weathered limestones. Mean annual air temperature is between 56°F and 63°F, and the climate is hot and arid. Annual precipitation is about 6" at the lowest elevation increasing to about 10" at the highest elevation.

IV. Sites Examined

Four specific sites were examined in the burn area. They were selected as typical and the most representative of the major soils in the watershed.

1. in the major wash

2. in a side tributary

3. on a centrally located eroded ridge of a low mountain

4. on an ridge near the westernmost edge of the burned area

V. Discussion

1. In the wash the soils are deep (4-6 feet) and very gravelly sandy loams. This alluvium is somewhat excessively drained and has a low water holding capacity (.048 in/in). This soil is moderately alkaline (pH 7.9 to 8.4). Gravel content is 60%. Present water erosion hazard is moderate. During a high intensity convective localized storm severe erosion may occur, because of large quantity and increased velocity of water flowing into the wash area from the adjoining mountain slopes. Gradient of the wash area is 2 to 4%.

2. In the short side tributaries the soil is deep (over 4 feet) in the centers of the washes and becomes less deep near the sides. These are very gravelly sandy loams. They are well drained to excessively drained and have very low water holding capacities for plant growth. These soils are moderately alkaline with a pH of 8.4 at the surface and 7.9 in the subsurface horizons. There is lime deposits on pebbles. The soil surface is 70 to 90% gravel. In the subsurface horizon at about 6" depth there is evidence of organic matter accumulation and many roots. Gradients of these soils are 2 to 8% and erosion is a potential hazard.

3. On a centrally located ridge of a low mountain the soils are loamy-skeletal, carbonatic, thermic Lithic Torriorthents, probably the St. Thomas series. These soils are very shallow ranging from 6" to 10" deep. The texture throughout is loam modified by limestone rock fragments. The pH is 8.0 to 8.4 and there is secondary carbonate deposits on pebbles and rocks. No lime concretions were observed. Sixty five to 90% of the soil surface is covered by pebbles and cobblestones. In the surface horizon there is less than 35% rock fragments but the underlying material has 90% or more rock fragments. Roots are scarce and only few fine and very fine roots were seen. Slopes range from 30 to 65%. Water holding capacity is very low (.075 in/in) and due to the shallowness of the soil water available for plant growth is limited. The present erosion hazard is moderate. During high severe because of the combined effects of gradient and the absence of vegetation to interrupt rainfall impact.

4. The soils examined on the westernmost reaches of the fire are very similar to the St. Thomas soils just discussed. Texture, depth, pH, rock fragment in the subsurface horizon and roots are as described

above. Color of the soil is slightly more red. This may be caused by this soil being at a higher elevation where there is more moisture during periods of the year and a slight increase in iron coatings on the sand particles. Evidence of soil creep can be seen by accumulation of soil at plant crowns and upslope of deeply imbedded rock fragments. There is little gully erosion now going on, but sheet erosion most probably does occur. The pH of this soil is 7.9 to 8.4 (moderately alkaline) and it is violently effervescent. Soil structure of the surface layer is platy (firm cohesive platelike soil peds) and runoff would be high. Water holding capacity is limited by the shallow depth and rock fragment content, and is low. Slopes range 30 to 50% except near the rock outcrop where it may exceed 100%.

VI. Recommendations

Range seeding should be done only with species that can withstand droughty conditions since there is a very limited water holding capacity of all the soils in this watershed.

To prevent soil erosion on the upper slopes, a grass should be planted there. If upper slope erosion does occur, the eroded material would flow to the lower less steep slopes or the washes and possibly bury any new growth starting to emerge. There is little likelihood of eroded material being removed from the watershed by water except during the most intense rainstorms.

Available nutrients for plant growth have not been considered here, since plants were growing there before the fire. If further consideration warrants, this information can be obtained. It should be noted that in general all desert soils are low in nitrogen and phosphorus which could inhibit rapid plant growth.

The alkaline condition of the soils in this watershed is similar to comparable areas of southern Nevada. The pH of 7.9 to 8.4 is relatively safe for native plants.

Soil surface conditions, including rock fragments, may tend to hold seeds in place for germination. Since this area receives the greatest amounts of precipitation during the winter months and early spring, the soil as a medium for plant growth would be in the best condition only in the spring. Sustained plant growth would be dependent on the natural recharge of summer rains to the soils.

Vehicular travel should be restricted to the wash bottoms, and only a minimum disturbance to soils on the slope should be permitted.

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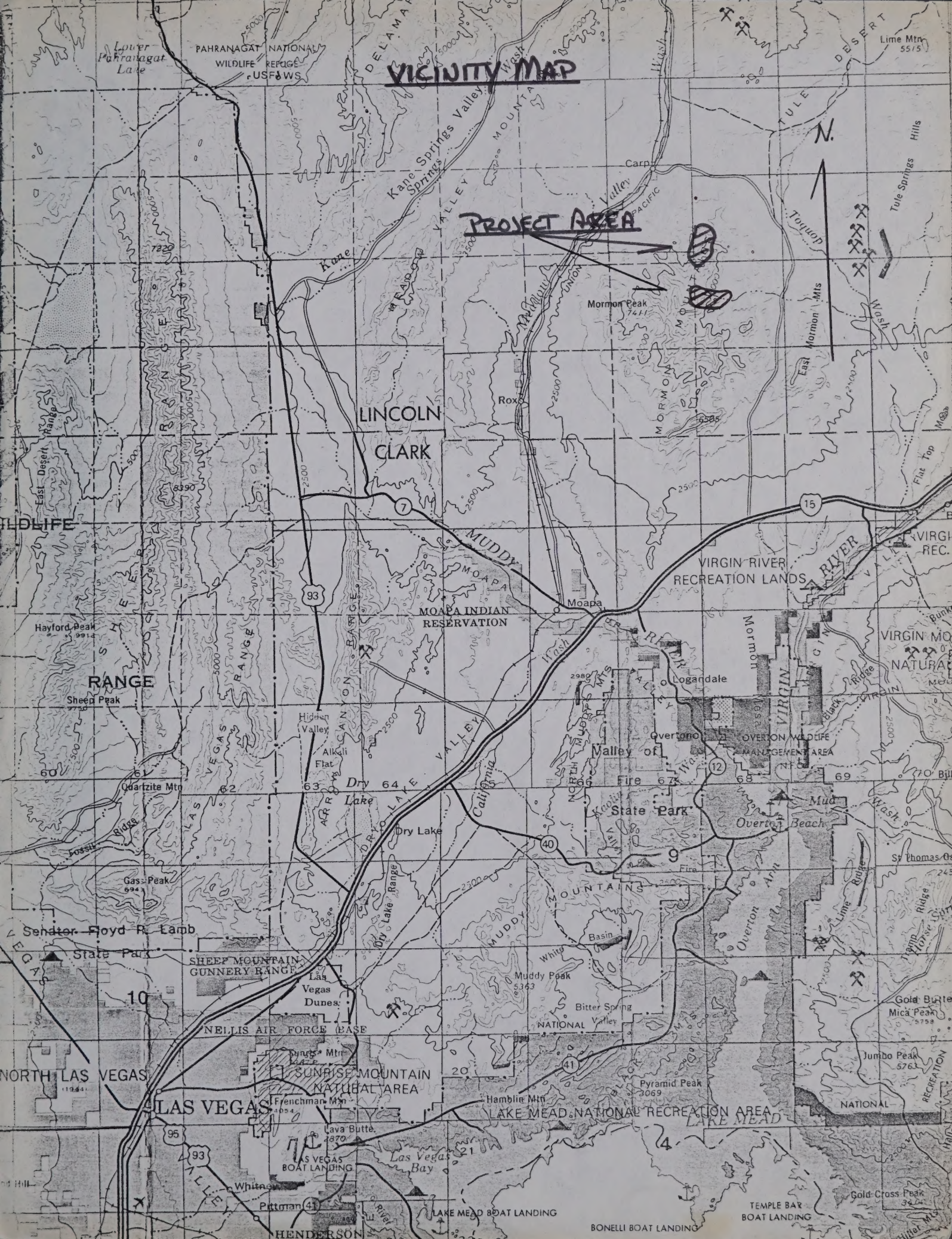
VICINITY MAP
PROJECT AREA
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MOAPA
MOAPA INDIAN RESERVATION
VIRGIN RIVER RECREATION LANDS
Moapa
Logandale
Overton
Valley of Fire
OVERTON WILDLIFE MANAGEMENT AREA
State Park
Overton Beach
Mud
Wash
Dry Lake
Dry Lake Valley
Dry Lake Range
Muddy Mountains
Overton Arm
Lake Mead
LAKE MEAD NATIONAL RECREATION AREA
Las Vegas Bay
LAS VEGAS
NORTH LAS VEGAS
HENDERSON
NELLIS AIR FORCE BASE
SUNRISE MOUNTAIN NATURAL AREA
SHEEP MOUNTAIN GUNNERY RANGE
Senator Floyd R. Lamb State Park
Las Vegas Dunes
Frenchman Mtn
Lava Butte
LAS VEGAS BOAT LANDING
LAKE MEAD BOAT LANDING
TEMPLE BAR BOAT LANDING
BONELLI BOAT LANDING
Pyramid Peak
Hamblin Mtn
Muddy Peak
Bitter Spring Valley
Mormon Peak
Carp
Rox
Kane Springs Valley
Kane Springs Wash
Tule Desert
Lime Mtn
Tule Springs Hills
Toquop Wash
East Mormon Mts
Mormon Mountains
Virgin River
Virgin Mountains
Gold Butte
Mica Peak
Jumbo Peak
Gold Cross Peak
Hayford Peak
Sheep Peak
Quartzite Mtn
Gass Peak
Hidden Valley
Alkali Flat
Arrow Canyon Range
Las Vegas Range
Sheep Mountain
Fossil Ridge
East Desert Range
Lower Pahranagat Lake
PAHRANAGAT NATIONAL WILDLIFE REFUGE
USFWS
Delamar Valley
Meadow Valley Mountains
Pahroc Range
Timpahute Range
Lime Ridge
Flat Top Mesa
Black Ridge
Virgin Rec.
Burnt
Bill
St Thomas
Gold Butte
Recreation
National
Whitney
Patterson
Gibbs
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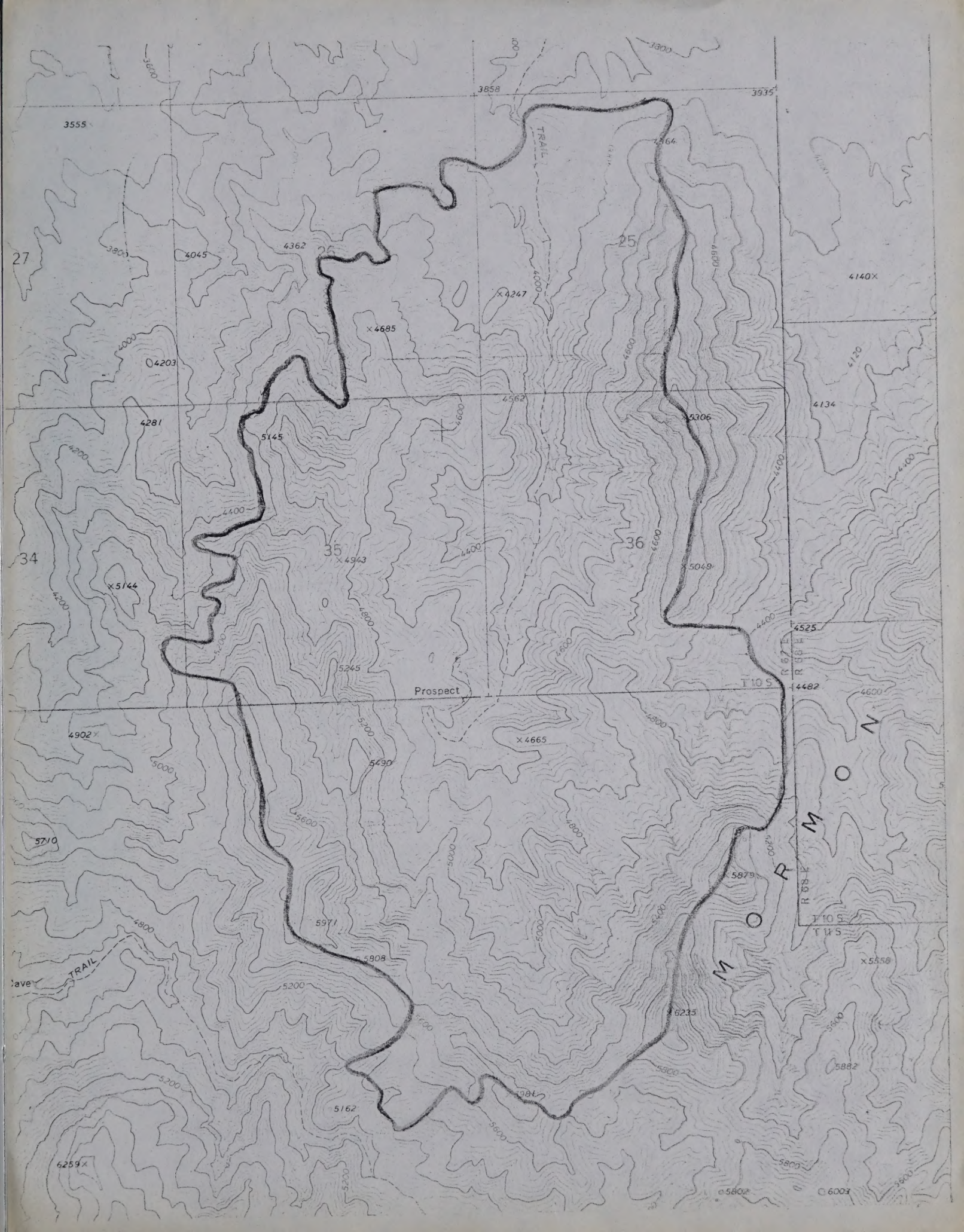
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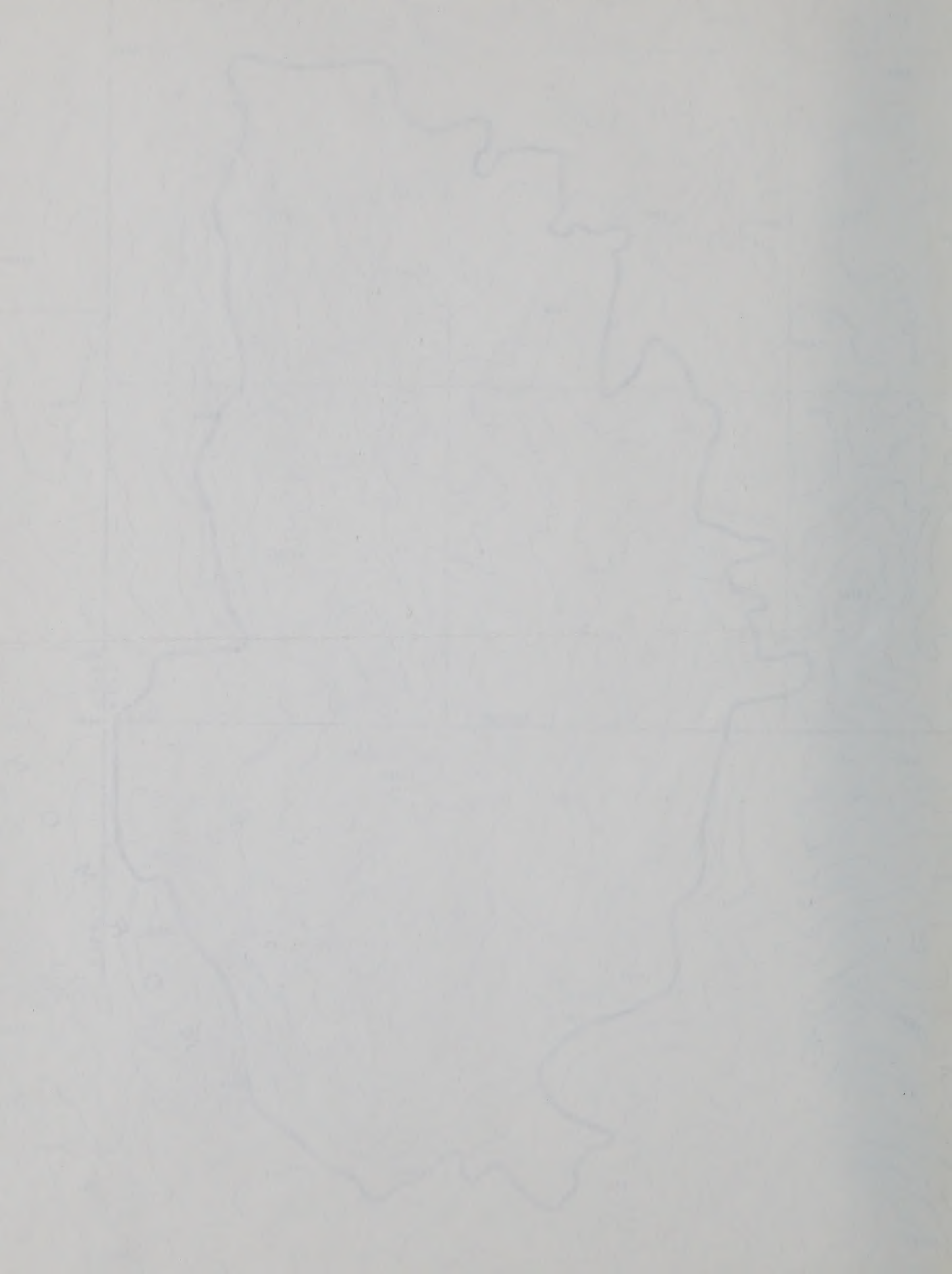

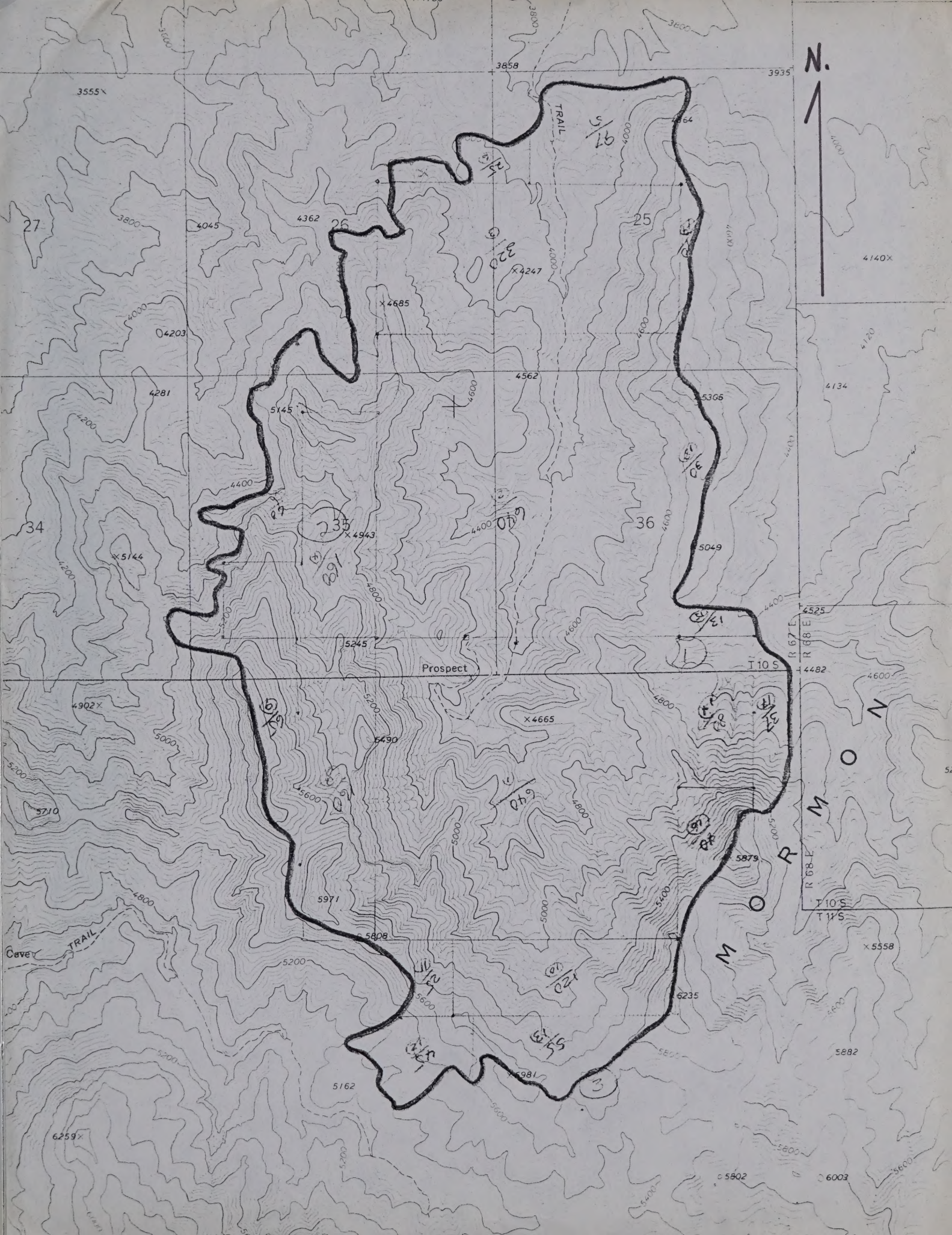
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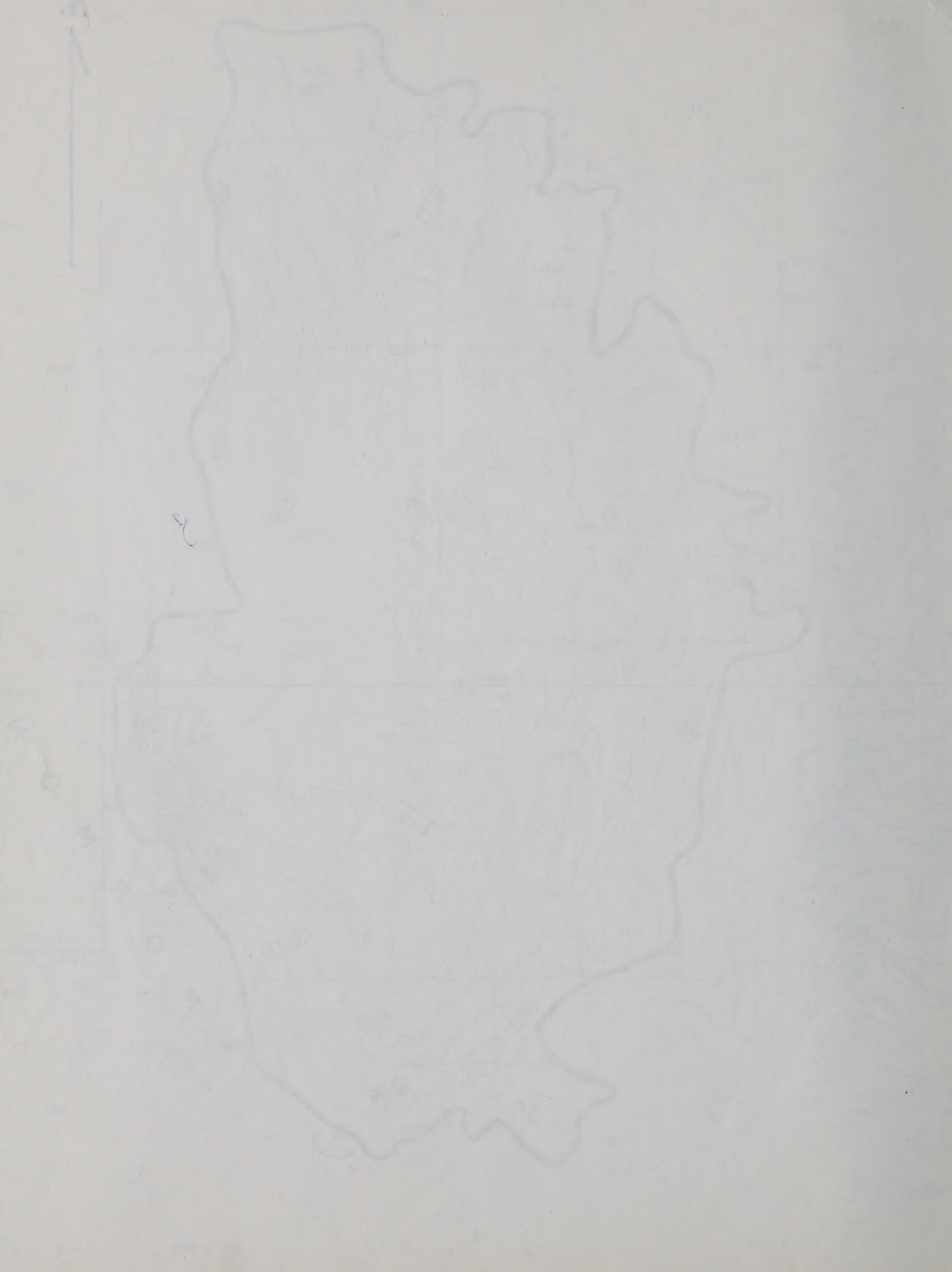


Memo

To: Phillip V. Range, Area Manager

From: Donald Buck, Soil Scientist

Subject: Condition of Soils after a fire in the Morman Mountains of Nevada. A Feasibility Report.

The above report is attached for your consideration.

Donald F. Buck

Reports on Soils for
Horse Springs Fire
In Morman Mountains
26-27 August, 1978

Introduction

A fire occurred on 26-27 August 1978 that burned approximately 1600 acres of vegetative cover in the Morman Mountain Range. The fire completely destroyed all vegetation on slopes of 50% or greater, most all vegetation on lesser slopes (15 to 50%), and did leave some standing desert shrub and brush on the 0 to 15% slopes. The entire area is at this time (August 30, 1978) covered with a fine dust-like ash, which can and does blow into great clouds that deposit residue over the soils within and outside the burn area.

Scopes

This report covers only the soils aspect of re-establishing vegetative cover; i.e. the soils capability to foster germination, to sustain a growing plan and maintain a safe root zone environment for continued plant growth.
This report does not address the type of vegetation that should or may be introduced there.

Methodology

In the burned area, several pits were hand dug, and the soils were examined. Two representative sites were used, being the most typical of the area being considered. Data was taken from these pits that allowed me to class the soils into Calciorthids, and to make some general statements of the soils existing there. However, some specific data gathered allows me to make very definite statements about the exact soils condition in that precise location.

Discussion

The land form is upland, ancient, dissected alluvial fans. Parent material for the soils is dolomite, coming from the surrounding hills. The surface is desert pavement, being 85% to 90% covered by limestone pebbles overall. Three distinctly different soil taxa exist in the burned area.
First, the soils in the immediate bottoms of the wash; secondly, the soil taxa on the very shallow slopes (0-20%); and thirdly, soils on the more steep slopes.
In the washes, there are pebbles and boulders throughout the profile. The interstitial spaces are filled with a fine or very fine sandy loam or silt loam. Depth of the soil in the washes may be greater than 60 inches, except in locations where erosion has occured. Soil reaction (pH) ranges from 7.8 to 9.4, except on the surface. Surface pH is altered by ash from the burned plant tissue and is 9.0 or higher throughout the area. The top 1" of soil in the wash is too gravelly and bouldery to support a thick vegetative growth. Water holding capacity of the fine earth fraction is very high (.18 in/in), but there is very little fine earth in these profiles.

Example of water holding capacity:

0.18 inches of water/inch of soil
60 inches total depth
(0.18 in/in)(60in.)(0.1 soil) = 1.08 in.

Or, in plain language, there is only 1.08 inches of available water for plant growth in 5 feet of soil.
Erosion is not a problem in the washes.

At site MF-1 (attached map) the soil has very few pebbles incorporated into the soil, only the surface has a pebble covering. The texture is silt loam or very fine sandy loam. The pH ranges from 8.0 at the surface to 8.6 at 7". The $CaCO_3$ content is high, from parent limestone decomposition, and the soil is violently effervescent throughout. At 7" depth, there is a calcic horizon, weakly cemented, of coarse sandy loam. The thickness of this horizon is unknown, but it most probably rests directly on a petrocalcic (caliche) layer. Soils of this family (Delnorte) can be found on the gentle slopes and the level surfaces throughout the area.

Generally, the depth of these soils will increase with a decrease in slope.

Erosion will occur on steeper slopes when these soils have the protective pebble cover disturbed, since they have weak sub-angular blocky structure and a loose consistency when dry. They have very little content of clays.

Water holding capacity of these soils is moderately high.

$$(0.19 \text{ in/in})(7 \text{ in}) = 1.33$$

again, 1.33 inches of water in 7" soil.

Pit MF-2 (attached map) had a very gravelly surface, and cobbles, pebbles, and boulders imbedded in the top 2 to 3 inches.

Texture is silt loam, and the depth was 16". The pH ranges from 7.8 to 8.0. Roots and pores present indicate a very suitable soil for plants, as did the structure and consistence. $CaCO_3$ deposits begin around 2 inches and were noted to a depth of 16 inches. This brown to dark brown soil has a petrocalcic horizon deeper than 16" except on some eroded spots on hillsides. This pit had an eastern aspect and an 8% slope.

Fire Caused Conditions

As mentioned earlier, there is a fine ash covering the soil surface throughout the burned area. When tested for pH, this ash tested 9.0 or higher. Since pure carbonates have a pH of 8.4, the question persists as to the reason for the ash and surface alkalinity. One possible answer is the content of Sodium (Na) in the ash. Sources report burned plant tissue almost always has a very high content of Na. There is, however, the problem of determining the source of Na for the plant, since there is very little to none available in the soil (H. Borup, personal communication). The silt loam or very fine sandy loam texture of all soils in this watershed will tend to absorb and hold Na, if it is present. Surface pH may remain altered (more alkaline) until sufficient precipitation occurs to remove the carbonates or sodium by leaching downward.

Conclusion & Recommendation

Surface pH is the greatest hazard to seeding. Erosion problems exist but careful consideration prior to surface disturbance can prevent excessive soil loss. Wash bottoms are probably not reseedable, due to rock fragments.

The steep upper slopes have 25% to 35% rock outcrop and are therefore not seedable.

The slopes on the hillsides have a lithic soil, again probably not seedable. Slopes up to 15% have the best potential for seeding.

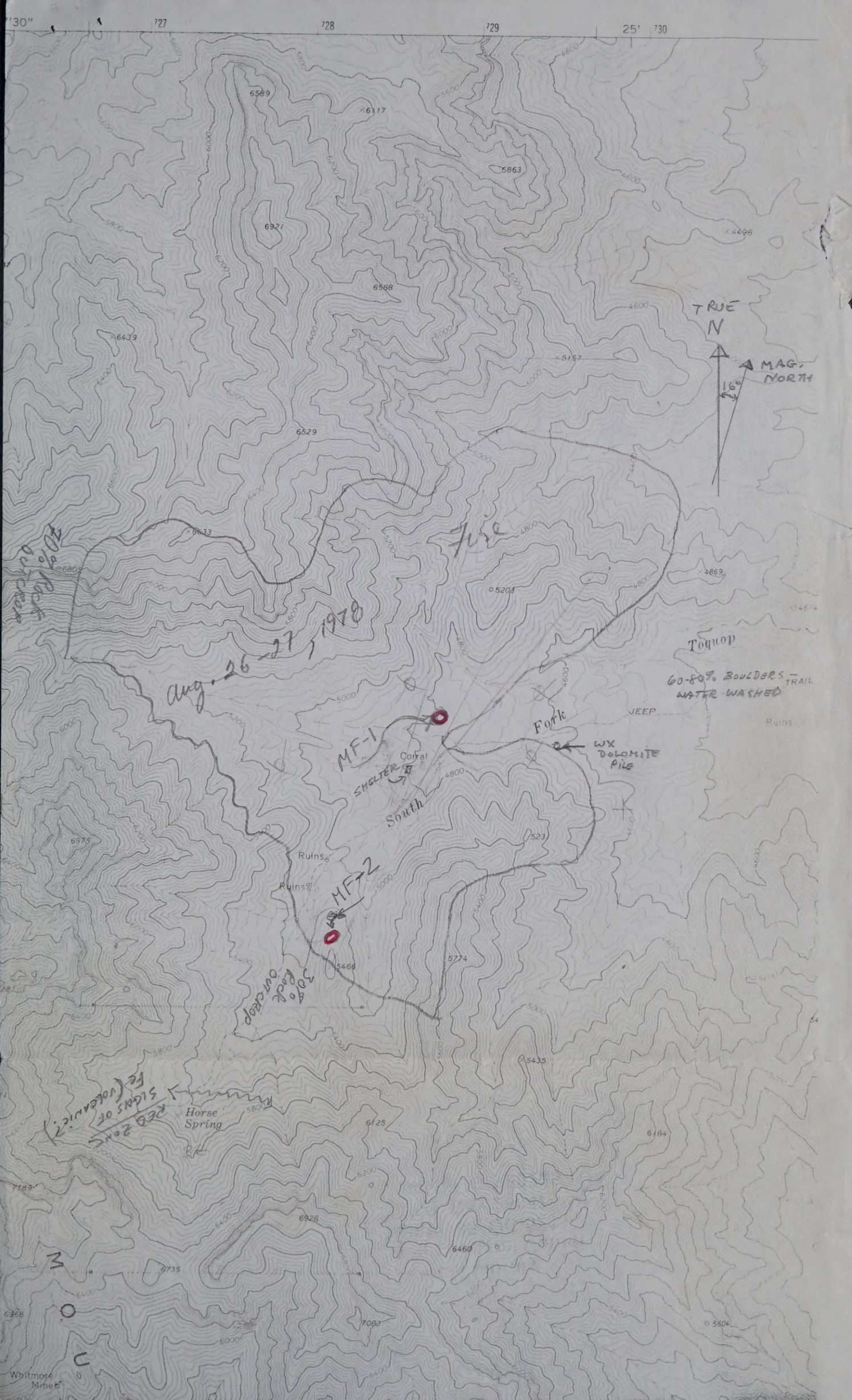
Testing for available nutrients can be done if the program warrants it, and further testing of soil reaction should be done.

A condition exists that may prove hazardous to plants. Since the surface pH is so high, an addition of water may cause a solution of high osmotic pressure to occur. If this does take place, plants starting to emerge would be dissicated and die. If, however, the salts are removed by water, either through leaching or surface runoff, the problem would be alleviated. It is also possible to alter the pH by the addition of elemental sulfur, but further research must be done to state precisely the desired application rates.

A potentially undesirable condition could occur if sulfur is added in that a reaction may take place that would create excess gypsum in the soil surface, aw well as lower the pH.

$$CaCO3 + S + H2O \rightarrow$$
$$CaSO4 + 2H^{+} + COOH^{-}$$
(not empirical)

Gypsum is water soluble and can be easily leached from the soil profile.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Aug. 26-27, 1978
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60-80% BOULDERS — TRAIL
WATER WASHED
JEEP
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Fork
WX
DOLOMITE
PILE
MF-1
Corral
SHELTER
South
5231
Ruins
Ruins
MF-2
5466
5774
5435
Horse
Spring
6125
6164
6926
6460
7083
5604
Whitmore
Mines

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P.O. Box 25047
Denver, CO 80225

MF-2

Calcorthid

Taxonomic Unit:

ID. No.:

No.	Horizon	Depth (in./cm)	Color		Mottles	Texture	Coarse fragments (% vol.)				Particle-size estimate (% wt.)				Cutans
			Dry	Moist			Gravel	Cobbles	Stones	2-5 mm	Sand	Silt	Clay	S>VFS	
1	A-1	0-2"	10YR 5/4	10YR 3/3	-0-	VGR SiL	>50%								
2		2-5"	7.5YR 4/4	5YR 3/4	Ca	L									
3		5-13	"	"	Ca	Sil									
4	unk														
					secondary										
					lime										

No.	Structure	Consistence			Cementation	$CaCO_3$ and effervescence	pH	Estimated		Permeability (in./hr.)	Pores	Roots	Boundary
		Dry	Moist	Wet				$ECx10^3$	ESP				
	Crumb	FIRM	FRIABLE	SO-PO	NONE	EO ES	7.8 8.0					FEW F-C	C-S
	BK	VF	FR	SO-PO	Lime on	ES						FEW VF-F	A-W
	Crumb	VF	FR	SO-PO	Pebbles	ES	7.8-8.0					FEW VF-F	
		ca on pebbles			-all sides -		pebb.		EV				

MF-2

SCS-SOILS-

PEDON DESCRIPTION

U.S. Department of Agriculture
Soil Conservation Service

Area: Mormon Fwl	Date: 8-30-78	ID. No.: MF-2	By: Dan Bank

Taxonomic unit:

Mapping unit symbol:

Location:

Physiographic position: interfluve "ancient"

Parent material: Alluvium - limestone - loess

Native vegetation (or crop): desert Shrub

Average annual precipitation:	Average annual air temperature:	Freeze-free season (32 F.):	Soil temperature (50 cm):	Length and shape of slope:

Slope percentage: 4-8%	Aspect: East	Elevation (feet):	Microrelief:

Drainage:	Depth to water table: VD	Runoff: mod -	Flooding: none	Profile permeability:

Dissection:	Present erosion:	Erosion hazard:	Erosion factors: K: T:

Land use: Rangl

Additional notes: surface dust 9.0 mp (High ESP)

Diagnostic surface horizons and depths: mollic

Diagnostic subsurface horizons and depths: Cca 5-13"

Textural control section depth:	Clay in control section (%):	Coarse fragments in control section (% vol).:	> vfs in control section (% wt.):
Control section particle size class:	Control section mineralogy: Carbonatic	Soil temperature regime: Mesic	Soil moisture control section depth:
Soil moisture regime:	Depth to lithic contact:	Depth to paralithic contact:	Depth to hardpan:

Surficial gravel (% area):	Surficial cobbles (% area):	Surficial stones (% area):	Total surficial coarse fragments (% area):	Rock outcrop (% area):
→	→	> 25%		

Additional surface features: desert pavement - ~ 90% pebbles of dolomite

MF-2

in Arthe Mallie

Delnorte Family Typic Calciorthids

Taxonomic Unit: ID. No.:

No.	Horizon	Depth (in./cm)	Color Dry	Color Moist	Mottles	Texture	Coarse fragments (% vol.) Gravel	Cobbles	Stones	2-5 mm	Particle-size estimate (% wt.) Sand	Silt	Clay	S>VFS	Cutans
1		0-4	10YR 5/3	10YR 3/2	NONE	SiL VFS			10%	10%					
2		4-7	10YR 5/3	10YR 4/4	NONE	SL	—	—	—	<5%	90	<10%			
3		7+	7.5YR 8/2	10YR 7/2		Sand									

No.	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Cementation	$CaCO_3$ and effervescence	pH	Estimated ECx10^3	Estimated ESP	Permeability (in./hr.)	Pores	Roots	Boundary
1	WEAK SBK	LOOSE	Friable	SO-PS	Ø	EV	8.0			Rapid	MANY F-VF	MANY VF-	C-S
2	SBK-crumb	MOD-FIRM	FRIABLE	SO-PO	Ø		8.4			Rapid	"	F-FEW VF	C-W
3	MASSIVE	FIRM	FIRM		cemented		8.6		✓	IMPED	NONE	→	→
	surface covered with wx. limestone pebbles.												
	fine OM in 1 & 2 — root particles may be												
3	Na test positive												
2	Na negative												

MF-1

SCS-SOILS-

U.S. Department of Agriculture
Soil Conservation Service

PEDON DESCRIPTION

Area: Mormon Mts Range	Date: 8-30-78	ID. No.: MF-1	By: Ken Beck

Taxonomic unit:

Mapping unit symbol:

Location: Moapa Peak chart

Physiographic position:

Parent material: alluvium from limestone hills + wind blown VFS - silt

Native vegetation (or crop): desert shrub

Average annual precipitation:	Average annual air temperature:	Freeze-free season (32 F.):	Soil temperature (50 cm):	Length and shape of slope:
				long convex

Slope percentage:	Aspect:	Elevation (feet):	Microrelief:	
30%-25%	SO EAST			

Drainage:	Depth to water table:	Runoff:	Flooding:	Profile permeability:
	VD			

Dissection:	Present erosion:	Erosion hazard:	Erosion factors:
	slight/creep	slight, moderate	K: T:

Land use: Range

Additional notes:

Diagnostic surface horizons and depths:

Diagnostic subsurface horizons and depths: cam Cca 7"+ prob to petrocalcic

Textural control section depth:	Clay in control section (%):	Coarse fragments in control section (% vol).:	> vfs in control section (% wt.):
0-7	none		

Control section particle size class:	Control section mineralogy:	Soil temperature regime:	Soil moisture control section depth:
	carbonatic	~~thermic~~ mesic	Sur → 7"

Soil moisture regime:	Depth to lithic contact:	Depth to paralithic contact:	Depth to hardpan:
	7" para → ?		?

Surficial gravel (% area):	Surficial cobbles (% area):	Surficial stones (% area):	Total surficial coarse fragments (% area):	Rock outcrop (% area):
80%	10-15%	none		

Additional surface features: desert pavement

MF-1